

BULBOTHRIX, PARMELINA, RELICINA, AND XANTHOPARMELIA,  
FOUR NEW GENERA IN THE PARMELIACEAE (LICHENES)\*

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BULBOTHRIX Hale, gen. nov.

Syn.: *Parmelia* subgenus *Parmelia* section *Imbricaria* sub-section *Bicornutae* (Lyngé) Hale & Kurok. Contr. U.S. Nat. Herb. 36:135. 1964.

Thallus adnatus, orbicularis, cinereo-albidus, lobis sub-linearibus vel raro subirregularibus, saepe angustis, margine bulbato-ciliatis; subtus niger vel brunneus, rhizinosus, rhizinis simplicibus vel ramosis. Apothecia adnata, disco imperforato, sporis octonis, raro bicornutis, simplicibus.

Type species: *Bulbothrix semilunata* (Lyngé) Hale, comb. nov.  
Basionym: *Parmelia semilunata* Lyngé, Ark. Bot. 13(13):23. 1914.

*Bulbothrix* is easily recognized by the black marginal bulbate cilia. Some of the South American species, as *B. schiffneri* and *B. semilunata*, are extremely small with lobes no more than 0.5 mm wide. A few Asian species, on the other hand, as *B. meizospora* and *B. setschwanensis*, have rather broad (to 5 mm wide), almost subirregular lobes. The upper cortex is typically composed of palisade plectenchyma with a pored epicortex (Hale, 1973). All species contain only atranorin in the cortex and are whitish to brownish mineral gray. The species are about equally divided between the Old World and the New World, occurring predominantly on trees in lowland rain forest and in scrub or secondary forests at lower elevations in subtropical to temperate regions.

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*Bulbothrix* is obviously related to the genus *Relicina*, which has similar bulbate cilia. The two genera, however, have quite different chemical profiles and phytogeographic affinities. The 33 known species (including the type of the genus) include the following:

- Bulbothrix affixa* (Hale & Kurok.) Hale, comb. nov. Basionym:  
*Parmelia affixa* Hale & Kurok. Contr. U.S. Nat. Herb. 36:137. 1964.
- Bulbothrix apophysata* (Hale & Kurok.) Hale, comb. nov. Basionym:  
*Parmelia apophysata* Hale & Kurok. Contr. U.S. Nat. Herb. 36:138. 1964.
- Bulbothrix atrichella* (Nyl.) Hale, comb. nov. Basionym: *Parmelia atrichella* Nyl. Flora 68:614. 1885.
- Bulbothrix bicornuta* (Müll. Arg.) Hale, comb. nov. Basionym:  
*Parmelia bicornuta* Müll. Arg. Flora 74:377. 1891.
- Bulbothrix bulbochaeta* (Hale) Hale, comb. nov. Basionym: *Parmelia bulbochaeta* Hale in Hale & Kurok. Contr. U.S. Nat. Herb. 36:138. 1964.
- Bulbothrix chowoensis* (Hale) Hale, comb. nov. Basionym: *Parmelia chowoensis* Hale, Phytol. 23:343. 1972.
- Bulbothrix confoederata* (Culb.) Hale, comb. nov. Basionym: *Parmelia confoederata* Culb. Amer. Journ. Bot. 48:169. 1961.
- Bulbothrix continua* (Lyngé) Hale, comb. nov. Basionym: *Parmelia continua* Lyngé, Ark. Bot. 13(13):109. 1914.
- Bulbothrix coronata* (Fée) Hale, comb. nov. Basionym: *Parmelia coronata* Fée, Essai Crypt. 123. 1824.
- Bulbothrix decurtata* (Kurok.) Hale, comb. nov. Basionym: *Parmelia decurtata* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:139. 1964.
- Bulbothrix fungicola* (Lyngé) Hale, comb. nov. Basionym: *Parmelia fungicola* Lyngé, Ark. Bot. 13(13):129. 1914.
- Bulbothrix hypocraea* (Vainio) Hale, comb. nov. Basionym: *Parmelia hypocraea* Vainio, Cat. Welw. Pl. 2(2):400. 1901.
- Bulbothrix imshaugii* (Hale) Hale, comb. nov. Basionym: *Parmelia imshaugii* Hale, Phytol. 22:31. 1971.
- Bulbothrix isidiza* (Nyl.) Hale, comb. nov. Basionym: *Parmelia isidiza* Nyl. Bull. Soc. Broter. 3:130. 1884.
- Bulbothrix laevigatula* (Nyl.) Hale, comb. nov. Basionym: *Parmelia laevigatula* Nyl. Flora 68:614. 1885.
- Bulbothrix meizospora* (Nyl.) Hale, comb. nov. Basionym: *Parmelia tiliacea* var. *meizospora* Nyl. Syn. Lich. 383. 1860.
- Bulbothrix papyrina* (Fée) Hale, comb. nov. Basionym: *Parmelia papyrina* Fée, Essai Crypt. Suppl. 121. 1837.
- Bulbothrix pigmentacea* (Hale) Hale, comb. nov. Basionym: *Parmelia pigmentacea* Hale, Journ. Jap. Bot. 43:325. 1968.
- Bulbothrix pustulata* (Hale) Hale, comb. nov. Basionym: *Parmelia pustulata* Hale in Hale & Kurok. Contr. U.S. Nat. Herb. 36:140. 1964.

- Bulbothrix schiffneri* (Zahlbr.) Hale, comb. nov. Basionym: *Parmelia schiffneri* Zahlbr. Denkschr. Akad. Wiss. Wien 83:167. 1909.
- Bulbothrix scortella* (Nyl.) Hale, comb. nov. Basionym: *Parmelia scortella* Nyl. Flora 68:615. 1885.
- Bulbothrix sensibilis* (Stein. & Zahlbr.) Hale, comb. nov. Basionym: *Parmelia sensibilis* Stein. & Zahlbr. Bot. Jahrb. 60: 522. 1926.
- Bulbothrix setschwanensis* (Zahlbr.) Hale, comb. nov. Basionym: *Parmelia setschwanensis* Zahlbr. Symb. Sin. 3:184. 1930.
- Bulbothrix subcoronata* (Müll. Arg.) Hale, comb. nov. Basionym: *Parmelia subcoronata* Müll. Arg. Rev. Mycol. 9:135. 1887.
- Bulbothrix subdissecta* (Nyl.) Hale, comb. nov. Basionym: *Parmelia subdissecta* Nyl. in Nyl. & Cromb. Journ. Linn. Soc. London 20:51. 1883.
- Bulbothrix subglandulifera* (Hue) Hale, comb. nov. Basionym: *Parmelia subglandulifera* Hue, Nouv. Arch. Mus. Paris, ser. 4, 1:144. 1899.
- Bulbothrix subinflata* (Hale) Hale, comb. nov. Basionym: *Parmelia subinflata* Hale, Journ. Jap. Bot. 40:201. 1965.
- Bulbothrix suffixa* (Stirt.) Hale, comb. nov. Basionym: *Parmelia suffixa* Stirt. Scot. Nat. 4:299. 1877-78.
- Bulbothrix tabacina* (Mont. & v.d. Bosch) Hale, comb. nov. Basionym: *Parmelia tabacina* Mont. & v.d. Bosch, in Mont. Sylloge Gen. Spec. Crypt. 327. 1856.
- Bulbothrix ventricosa* (Hale & Kurok.) Hale, comb. nov. Basionym: *Parmelia ventricosa* Hale & Kurok. Contr. U.S. Nat. Herb. 36:140. 1964.
- Bulbothrix viridescens* (Lynge) Hale, comb. nov. Basionym: *Parmelia viridescens* Lynge, Ark. Bot. 13(13):117. 1914.

PARMELINA Hale, gen. nov.

Thallus adnatus, orbicularis, cinereo-albidus vel raro viridiflavicans, lobis sublinearibus vel subirregularibus, margine ciliatis, ciliis simplicibus; subtus niger vel raro brunneus, modice rhizinosus usque ad marginem, rhizinis simplicibus vel raro squarrose ramosis. Apothecia adnata, disco imperforato, sporis octonis, simplicibus.

Type species: *Parmelina tiliacea* (Hoffm.) Hale, comb. nov. Basionym: *Lichen tiliaceus* Hoffm. Enum. Lich. 96. 1784.

This generic segregate of *Parmelia* is characterized by marginal cilia, usually well developed but sometimes confined mostly to the sinuses of lobes. Only two species, *P. enomis* and *P. expallida*, have a uniformly pale brown rather than black lower surface. The upper cortex has palisade plectenchyma and a pared epicortex (Hale, 1973). Only one species produces the cortical pigment usnic acid (*P. nylanderii*).

The 41 species recognized in *Parmelina* were formerly classified in *Parmelia* subgenus *Parmelia* section *Imbricaria* (Schreb.) Fr. (Hale & Kurokawa, 1964). The generic name *Imbricaria*, which was used by a number of lichenologists in the 19th century, is a later homonym of *Imbricaria* Jussieu (phanerogams).

In addition to the type, the following 40 species are recognized in the genus.

- Parmelina antillensis* (Nyl.) Hale, comb. nov. Basionym: *Parmelia antillensis* Nyl. Bull. Soc. Linn. Normand. ser. 2, 3:264. 1868.
- Parmelina aurulenta* (Tuck.) Hale, comb. nov. Basionym: *Parmelia aurulenta* Tuck. Journ. Amer. Acad. Arts Sci. ser. 2, 25:424. 1858.
- Parmelina baguioensis* (Hale) Hale, comb. nov. Basionym: *Parmelia baguioensis* Hale, Bryol. 75:97. 1972.
- Parmelina carporhizans* (Tayl.) Hale, comb. nov. Basionym: *Parmelia carporhizans* Tayl. Lond. Journ. Bot. 6:163. 1847.
- Parmelina consors* (Nyl.) Hale, comb. nov. Basionym: *Parmelia consors* Nyl. Flora 68:613. 1885.
- Parmelina cryptochlora* (Vainio) Hale, comb. nov. Basionym: *Parmelia cryptochlora* Vainio, Journ. Bot. Brit. & For. 34:34. 1896.
- Parmelina crystallorum* (Lyngé) Hale, comb. nov. Basionym: *Parmelia crystallorum* Lyngé, Ark. Bot. 13(13):128. 1914.
- Parmelina denegans* (Nyl.) Hale, comb. nov. Basionym: *Parmelia denegans* Nyl. Acta Soc. Sci. Fenn. 26(10):6. 1900.
- Parmelina dissecta* (Nyl.) Hale, comb. nov. Basionym: *Parmelia dissecta* Nyl. Flora 65:451. 1882.
- Parmelina enormis* (Hale) Hale, comb. nov. Basionym: *Parmelia enormis* Hale, Phytol. 23:344. 1972.
- Parmelina entotheiochroa* (Hue) Hale, comb. nov. Basionym: *Parmelia entotheiochroa* Hue, Nouv. Arch. Mus. Paris, ser. 4, 1:161. 1899.
- Parmelina expallida* (Kurok.) Hale, comb. nov. Basionym: *Parmelia expallida* Kurok. Bull. Nat. Sci. Mus. Tokyo 11:191. 1968.
- Parmelina galbina* (Ach.) Hale, comb. nov. Basionym: *Parmelia galbina* Ach. Syn. Lich. 195. 1814.
- Parmelina hayachinensis* (Kurok.) Hale, comb. nov. Basionym: *Parmelia hayachinensis* Kurok. Journ. Jap. Bot. 43:350. 1968.
- Parmelina heteroloba* (Zahlbr.) Hale, comb. nov. Basionym: *Parmelia heteroloba* Zahlbr. Denkschr. Wiss. Akad. Wien 83:171. 1909.
- Parmelina homogenes* (Nyl.) Hale, comb. nov. Basionym: *Parmelia homogenes* Nyl. Flora 68:607. 1885.
- Parmelina horrescens* (Tayl.) Hale, comb. nov. Basionym: *Parmelia horrescens* Tayl. Fl. Hibern. 144. 1836.
- Parmelina immiscens* (Nyl.) Hale, comb. nov. Basionym: *Parmelia immiscens* Nyl. Flora 68:606. 1885.
- Parmelina leucotyliza* (Nyl.) Hale, comb. nov. Basionym: *Parmelia leucotyliza* Nyl. Lich. Japon. 27. 1890.

- Parmelina lindmanii* (Lynge) Hale, comb. nov. Basionym: *Parmelia lindmanii* Lynge, Ark. Bot. 13(13):74. 1914.
- Parmelina melanochaeta* (Kurok.) Hale, comb. nov. Basionym: *Parmelia melanochaeta* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:133. 1964.
- Parmelina metarevoluta* (Asah.) Hale, comb. nov. Basionym: *Parmelia metarevoluta* Asah. Journ. Jap. Bot. 35:97. 1960.
- Parmelina muelleri* (Vainio) Hale, comb. nov. Basionym: *Parmelia muelleri* Vainio, Acta Soc. Faun. Fl. Fenn. 7(7):49. 1890.
- Parmelina nylanderii* (Lynge) Hale, comb. nov. Basionym: *Parmelia nylanderii* Lynge, Ark. Bot. 13(13):82. 1914.
- Parmelina obsessa* (Ach.) Hale, comb. nov. Basionym: *Parmelia obsessa* Ach. Syn. Lich. 195. 1814.
- Parmelina perisidians* (Nyl.) Hale, comb. nov. Basionym: *Parmelia perisidians* Nyl. Acta Soc. Sci. Fenn. 26(10):6. 1900.
- Parmelina phlyctina* (Hale) Hale, comb. nov. Basionym: *Parmelia phlyctina* Hale, Bryol. 62:129. 1959.
- Parmelina pilosa* (Stizb.) Hale, comb. nov. Basionym: *Parmelia pilosa* Stizb. Ber. St. Gall. Naturw. Ges. 1888-89:165. 1890.
- Parmelina pruinata* (Müll. Arg.) Hale, comb. nov. Basionym: *Parmelia pruinata* Müll. Arg. Flora 66:46. 1883.
- Parmelina quercina* (Willd.) Hale, comb. nov. Basionym: *Lichen quercinus* Willd. Fl. Berol. Prod. 353. 1787.
- Parmelina simplicior* (Hale) Hale, comb. nov. Basionym: *Parmelia simplicior* Hale, Bryol. 75:99. 1972.
- Parmelina spathulata* (Kurok.) Hale, comb. nov. Basionym: *Parmelia spathulata* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:133. 1964.
- Parmelina spumosa* (Asah.) Hale, comb. nov. Basionym: *Parmelia spumosa* Asah. Journ. Jap. Bot. 26:259. 1951.
- Parmelina subaurulenta* (Nyl.) Hale, comb. nov. Basionym: *Parmelia subaurulenta* Nyl. Flora 68:606. 1885.
- Parmelina subfaticens* (Kurok.) Hale, comb. nov. Basionym: *Parmelia subfaticens* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:134. 1964.
- Parmelina swinscowii* (Hale) Hale, comb. nov. Basionym: *Parmelia swinscowii* Hale, Phytol. 27:4. 1973.
- Parmelina usambarensis* (Stein. & Zahlbr.) Hale, comb. nov. Basionym: *Parmelia usambarensis* Stein. & Zahlbr. Bot. Jahrb. 60:524. 1925.
- Parmelina versiformis* (Kremph.) Hale, comb. nov. Basionym: *Parmelia versiformis* Kremph. Flora 61:464. 1878.
- Parmelina wallichiana* (Tayl.) Hale, comb. nov. Basionym: *Parmelia wallichiana* Tayl. London Journ. Bot. 6:176. 1847.
- Parmelina xantholepis* (Mont. & v.d. Bosch) Hale, comb. nov. Basionym: *Parmelia xantholepis* Mont. & v.d. Bosch. Pl. Jungh. 428. 1855.

RELICINA (Hale & Kurok.) Hale, comb. et stat. nov.

Basionym: *Parmelia* subgenus *Parmelia* section *Bicornutae* series *Relicinae* Hale & Kurok. Contr. U.S. Nat. Herb. 36:135. 1964.

Type species: *Relicina eumorpha* (Hepp) Hale, comb. nov.

Basionym: *Parmelia eumorpha* Hepp in Zollinger, Fl. Jungh. 9. 1854. (The designated type of series *Relicinae* is *Parmelia relicina* Fr., which would be invalid in the genus *Relicina* as a tautonym.)

The characteristic features of this generic segregate of *Parmelia* are the marginal bulbate cilia and presence of usnic acid in the cortex. All species have rather small, adnate to closely adnate thalli and are predominantly corticolous in the lowland to mid elevation tropical rain forest, particularly in Southeast Asia. The upper cortex has palisade plectenchyma and a pored epicortex (Hale, 1973). The apothecia are adnate, small, and frequently coronate with small black bulbils. The lower surface may be black or pale brown and the rhizines simple to densely branched. There are 22 species, including the type, presently recognized in the genus, as follows:

- Relicina abstrusa* (Vainio) Hale, comb. nov. Basionym: *Parmelia abstrusa* Vainio, Acta Soc. Faun. Fl. Fenn. 7(7):64. 1890.
- Relicina acrobotrys* (Kurok.) Hale, comb. nov. Basionym: *Parmelia acrobotrys* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:142. 1964.
- Relicina circumnodata* (Nyl.) Hale, comb. nov. Basionym: *Parmelia circumnodata* Nyl. in Nyl. & Cromb. Journ. Linn. Soc. London 20:51. 1883.
- Relicina connivens* (Kurok.) Hale, comb. nov. Basionym: *Parmelia connivens* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:142. 1964.
- Relicina decaryana* (Gyel.) Hale, comb. nov. Basionym: *Parmelia decaryana* Gyel. Fedde Repert. Sp. Nov. 36:153. 1934.
- Relicina echinocarpa* (Kurok.) Hale, comb. nov. Basionym: *Parmelia echinocarpa* Kurok. Journ. Jap. Bot. 40:265. 1965.
- Relicina eximbricata* (Gyel.) Hale, comb. nov. Basionym: *Parmelia samoensis* var. *eximbricata* Gyel. Ann. Mycol. 36:288. 1938.
- Relicina fluorescens* (Hale) Hale, comb. nov. Basionym: *Parmelia fluorescens* Hale, Journ. Jap. Bot. 40:202. 1965.
- Relicina limbata* (Laurer) Hale, comb. nov. Basionym: *Parmelia limbata* Laurer, Linnaea 2:39. 1827.
- Relicina luteoviridis* (Kurok.) Hale, comb. nov. Basionym: *Parmelia luteoviridis* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:144. 1964.
- Relicina malesiana* (Hale) Hale, comb. nov. Basionym: *Parmelia malesiana* Hale, Journ. Jap. Bot. 40:203. 1965.
- Relicina planiuscula* (Kurok.) Hale, comb. nov. Basionym: *Parmelia planiuscula* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:144. 1964.

- Relicina ramosissima* (Kurok.) Hale, comb. nov. Basionym: *Parmelia ramosissima* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:145. 1964.
- Relicina relicinella* (Nyl.) Hale, comb. nov. Basionym: *Parmelia relicinella* Nyl. Flora 68:615. 1885.
- Relicina relicinula* (Müll. Arg.) Hale, comb. nov. Basionym: *Parmelia relicinula* Müll. Arg. Flora 65:317. 1882.
- Relicina samoensis* (Zahlbr.) Hale, comb. nov. Basionym: *Parmelia samoensis* Zahlbr. Denkschr. Kais. Wiss. Akad. Wien 81:272. 1908.
- Relicina schizospatha* (Kurok.) Hale, comb. nov. Basionym: *Parmelia schizospatha* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:146. 1964.
- Relicina subabstrusa* (Gyel.) Hale, comb. nov. Basionym: *Parmelia subabstrusa* Gyel. Fedde Repert. Sp. Nov. 29:288. 1931.
- Relicina sublanea* (Kurok.) Hale, comb. nov. Basionym: *Parmelia sublanea* Kurok. in Hale & Kurok. Contr. U.S. Nat. Herb. 36:146. 1964.
- Relicina sublimbata* (Nyl.) Hale, comb. nov. Basionym: *Parmelia sublimbata* Nyl. Flora 68:615. 1885.
- Relicina subturgida* (Kurok.) Hale, comb. nov. Basionym: *Parmelia subturgida* Kurok. Journ. Jap. Bot. 40:268. 1965.
- Relicina sydneyensis* (Gyel.) Hale, comb. nov. Basionym: *Parmelia sydneyensis* Gyel. Ann. Mycol. 36:292. 1938.

XANTHOPARMELIA (Vainio) Hale, stat. & comb. nov.

Basionym: *Parmelia* section *Xanthoparmelia* Vainio, Acta Soc. Faun. Fl. Fenn. 7(7):60. 1890.

Type species: *Xanthoparmelia conspersa* (Ach.) Hale, comb. nov. Basionym: *Lichen conspersus* Ach. Prod. Lich. Suec. 118. 1798.

*Xanthoparmelia* was first proposed by Vainio as a section under *Parmelia* to accommodate all narrow-lobed yellow species. We know now that the yellow or yellow-green color is caused by the cortical pigment usnic acid, but by using this criterion alone Vainio included several diverse elements, not only typical saxicolous species with simple rhizines, such as *X. conspersa*, but also *Parmelia flavida* and *P. vellosiae* both of which have dichotomously branched rhizines, and *P. abstrusa* (= *Relicina abstrusa* (Vainio) Hale), which has bulbate cilia. Recent workers have put more reliance on cilia and rhizine characters (cf. Hale & Kurokawa, 1964), including in *Xanthoparmelia* only those saxicolous species with simple rhizines, no cilia, and usnic acid in the cortex. The upper cortex has palisade plectenchyma and a pored epicortex (Hale, 1973). This combination of characters seems to me to form a reasonable basis for segregating *Xanthoparmelia* from the collective genus *Parmelia*.

The following list contains the 93 species (in addition to the type) presently classified in *Parmelia* subgenus *Xanthoparmelia*.

- Xanthoparmelia adhaerens (Nyl.) Hale, comb. nov. Basionym: *Parmelia adhaerens* Nyl. in Cromb. Journ. Bot. Brit. & For. 14:19. 1876.
- Xanthoparmelia albornii (Hale) Hale, comb. nov. Basionym: *Parmelia albornii* Hale, Bot. Not. 124:345. 1971.
- Xanthoparmelia amphixantha (Müll. Arg.) Hale, comb. nov. Basionym: *Parmelia amphixantha* Müll. Arg. Flora 71:139. 1888.
- Xanthoparmelia amphixanthoides (Stein. & Zahlbr.) Hale, comb. nov. Basionym: *Parmelia amphixanthoides* Stein. & Zahlbr. Engl. Bot. Jahrb. 60:505. 1926.
- Xanthoparmelia arseneana (Gyel.) Hale, comb. nov. Basionym: *Parmelia arseneana* Gyel. Ann. Mycol. 36:269. 1938.
- Xanthoparmelia atroventralis (Hale) Hale, comb. nov. Basionym: *Parmelia atroventralis* Hale, Bot. Not. 124:346. 1971.
- Xanthoparmelia australiensis (Cromb.) Hale, comb. nov. Basionym: *Parmelia australiensis* Cromb. Journ. Linn. Soc. London 17: 395. 1879.
- Xanthoparmelia austroafricana (Stirt.) Hale, comb. nov. Basionym: *Parmelia austroafricana* Stirt. Trans. Glasgow Soc. Field Nat. 5:212. 1877.
- Xanthoparmelia benyovyszkjana (Gyel.) Hale, comb. nov. Basionym: *Parmelia benyovyszkjana* Gyel. Fedde Repert. Sp. Nov. 36:153. 1934.
- Xanthoparmelia brunthaleri (Stein. & Zahlbr.) Hale, comb. nov. Basionym: *Parmelia brunthaleri* Stein. & Zahlbr. Engl. Bot. Jahrb. 60:505. 1926.
- Xanthoparmelia camtschadalis (Ach.) Hale, comb. nov. Basionym: *Borreria camtschadalis* Ach. Syn. Lich. 223. 1814.
- Xanthoparmelia centrifuga (L.) Hale, comb. nov. Basionym: *Lichen centrifugus* L. Sp. Pl. 1142. 1753.
- Xanthoparmelia chalybeizans (Stein. & Zahlbr.) Hale, comb. nov. Basionym: *Parmelia chalybeizans* Stein. & Zahlbr. Engl. Bot. Jahrb. 60:509. 1926.
- Xanthoparmelia cheelii (Gyel.) Hale, comb. nov. Basionym: *Parmelia cheelii* Gyel. Ann. Mycol. 36:271. 1938.
- Xanthoparmelia chlorea (Stizb.) Hale, comb. nov. Basionym: *Parmelia chlorea* Stizb. Ber. St. Gall. Naturw. Gesell. 1888-89: 151. 1889.
- Xanthoparmelia chlorochroa (Tuck.) Hale, comb. nov. Basionym: *Parmelia chlorochroa* Tuck. Proc. Amer. Acad. Arts. Sci. 4:383. 1860.
- Xanthoparmelia colorata (Gyel.) Hale, comb. nov. Basionym: *Parmelia colorata* Gyel. Ann. Mycol. 36:272. 1938.
- Xanthoparmelia concolor (Spreng.) Hale, comb. nov. Basionym: *Parmelia concolor* Spreng. Syst. Veg. 4(2):328. 1827.
- Xanthoparmelia congensis (Stein.) Hale, comb. nov. Basionym: *Parmelia congensis* Stein. Jahresber. Schles. Gesell. Vaterl. Kultur 1888:140. 1888.
- Xanthoparmelia conspersula (Nyl.) Hale, comb. nov. Basionym: *Parmelia conspersula* Nyl. in Crombie, Journ. Bot. Brit. & For. 14:19. 1876.
- Xanthoparmelia constrictans (Nyl.) Hale, comb. nov. Basionym:



- Parmelia constrictans* Nyl. in Crombie, Journ. Bot. Brit. & For. 14:19. 1876.
- Xanthoparmelia convoluta* (Kremph.) Hale, comb. nov. Basionym: *Parmelia convoluta* Kremph. Verh. Zool.-Bot. Gesell. Wien 30: 337. 1881.
- Xanthoparmelia cordilleriana* (Gyel.) Hale, comb. nov. Basionym: *Parmelia cordilleriana* Gyel. Ann. Mycol. 36:276. 1938.
- Xanthoparmelia cumberlandia* (Gyel.) Hale, comb. nov. Basionym: *Parmelia subconspersa* var. *cumberlandia* Gyel. Fedde Repert. Sp. Nov. 36:164. 1934.
- Xanthoparmelia diadeta* (Hale) Hale, comb. nov. Basionym: *Parmelia diadeta* Hale, Bot. Not. 124:346. 1971.
- Xanthoparmelia dichotoma* (Müll. Arg.) Hale, comb. nov. Basionym: *Parmelia dichotoma* Müll. Arg. Flora 69:257. 1886.
- Xanthoparmelia dichromatica* (Hale) Hale, comb. nov. Basionym: *Parmelia dichromatica* Hale, Bot. Not. 124:348. 1971.
- Xanthoparmelia dierythra* (Hale) Hale, comb. nov. Basionym: *Parmelia dierythra* Hale, Bryol. 67:470. 1964.
- Xanthoparmelia dissensa* (Nash) Hale, comb. nov. Basionym: *Parmelia dissensa* Nash, Bryol. 76:214. 1973.
- Xanthoparmelia distincta* (Nyl.) Hale, comb. nov. Basionym: *Parmelia distincta* Nyl. Ann. Sci. Nat. Bot., ser. 4, 15:374. 1861.
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